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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/785,234	02/24/2004	Thomas W. Oakes	OAK-01	1047
7590 William J. Kolegraff 3119 Tumberry Way Jamul, CA 91935		06/21/2007	EXAMINER WILKINS III, HARRY D	
			ART UNIT 1742	PAPER NUMBER
			MAIL DATE 06/21/2007	DELIVERY MODE PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/785,234	Applicant(s) OAKES, THOMAS W.	
	Examiner Harry D. Wilkins, III	Art Unit 1742	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 15 May 2007.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1,3-20,23-27,29 and 30 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1,3-20,23-27,29 and 30 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 24 February 2004 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Claim Rejections - 35 USC § 112

1. The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

2. Claim 30 is rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention. The specification, as filed, does not fully support a claim limitation that the membrane was composed of Nafion® (sulfonated tetrafluoroethylene copolymer). The application as filed merely stated that the membrane utilized was obtained from DuPont Chemical Co. However, DuPont Chemical Co. sells more than one type of membrane, not just Nafion®, and these other membrane types are not made from sulfonated tetrafluoroethylene copolymer. Thus, Applicant has failed to provide a factual showing that the specification as filed supports a claim that includes the limitation that the membrane was made from sulfonated tetrafluoroethylene copolymer.

Claim Rejections - 35 USC § 102

3. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

4. Claims 1 and 7-12 are rejected under 35 U.S.C. 102(b) as being anticipated by Nakata (US 6,204,545).

Nakata teaches (see abstract, figures 26-28 and col. 26) a device for generating hydrogen gas comprising a vessel (251) having a transparent cover (252) and holding an electrolyte solution (254), a membrane (253) arranged in the vessel to form an oxygen chamber and a hydrogen chamber, a cathode (246) positioned in the hydrogen chamber, an anode (244) positioned in the oxygen chamber, a hydrogen gas exhaustion arrangement coupled to the hydrogen chamber and an electric source (240) connected to the cathode and the anode, wherein the electric source was a photovoltaic cell (see figures 26-27).

The membrane (253) of Nakata is disclosed as being semi-permeable. Because Nakata do not teach the membrane being a structural support within the cell, one of ordinary skill in the art would have concluded that the membrane was thin and flexible (to at least some degree).

Regarding claims 7-9, the cell of Nakata would have been capable of operating with any electrolyte. As per MPEP 2114 and 2115, apparatus claims are limited by the claimed structure, not in what material is placed within the structure. As such, the limitations of claims 7-9 have not been given further patentable weight.

Regarding claim 10, the membrane (253) of Nakata was arranged to form an oxygen chamber, with the anode (244) arranged within the oxygen chamber.

Regarding claim 11, Nakata suggested including (see figure 17) two or more membranes (43) forming two or more oxygen chambers and an anode within each of the two or more oxygen chambers.

Regarding claim 12, the device of Nakata included an oxygen gas collection area in the oxygen chamber and an oxygen gas exhaustion arrangement coupled to the oxygen gas collection area.

Claim Rejections - 35 USC § 103

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

6. Claims 3 and 15-19 are rejected under 35 U.S.C. 103(a) as being unpatentable over Nakata (US 6,204,545) in view of Dederick (US 5,512,787).

Nakata teaches (see figures) using only the solar panel as the means for generating the electric current for running the electrolyzer.

However, it was well known that solar panels only generated electricity during the day when the sky was sufficiently devoid of clouds.

Dederick teaches (see Figure 1A and abstract) the concept of using other renewable energy sources, such as solar panels, wind generators and wave action generators for powering an electrolyzer to reduce the need for fossil fuels to generate the required electricity. Further, Dederick shows (see Figure 1A) switching gear for using any of a plurality of power sources in combination.

Therefore, it would have been obvious to one of ordinary skill in the art to have used an external renewable energy source, such as an additional solar cell, a hydroelectric plant or a wind turbine to provide the electric power necessary to operate the electrolyzer because Dederick teaches that using such renewable resources reduced reliance on fossil fuels.

7. Claims 4-6 and 20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Nakata (US 6,204,545) in view of Russell (US 4,052,228).

The teachings of Nakata are described above.

Nakata fails to teach that the vessel and transparent cover were constructed such that the electrolyte and the cover acted to concentrate light rays onto the photovoltaic cell.

Russell teaches (see abstract and drawings) the concept of constructing the shape of a vessel and cover holding a photovoltaic cell such that the cover and the liquid within the vessel act to concentrate light rays on the photovoltaic cell.

Therefore, it would have been obvious to one of ordinary skill in the art to have reshaped the vessel of Nakata as taught by Russell for the purpose of increasing the concentration of light rays onto the photovoltaic cell, thereby increasing production of electric current.

Regarding claim 20, Russell teaches (see col. 1, lines 48-59) the concept of adding a cooling device in thermal communication with the electrolyte to ensure that efficient operation occurs. Therefore, it would have been obvious to one of ordinary skill

in the art to have added a cooling device in thermal communication with the electrolyte and coupled to the electric source.

8. Claims 13, 14, 23, 26, 27, 29 and 30 are rejected under 35 U.S.C. 103(a) as being unpatentable over Nakata (US 6,204,545) in view of Dempsey et al (US 3,870,616).

Nakata fails to disclose the exact nature of the semipermeable membrane.

However, one of ordinary skill in the art, in the absence of such detail, would have looked to similar water electrolyzers for the purpose of determining a proper membrane to use.

Dempsey et al shows (see paragraph spanning cols. 2 and 3) the conventional use of Nafion® membranes to separate an anode chamber from a cathode chamber in a water electrolyzers to allow separate collection of the produced hydrogen and oxygen gases.

Therefore, it would have been obvious to one of ordinary skill in the art to have made the device of Nakata with a semipermeable membrane (253) made from Nafion® (a conventional polymeric membrane made from sulfonated tetrafluoroethylene copolymer, that conducted protons and not electrons and was substantially impermeable to gases) because the Nafion® was conventionally known within the art of water electrolyzers to have the appropriate properties to separate anode chambers from cathode chambers.

Regarding claim 23, the electric source included a solar cell (240) in the vessel and positioned so that light can pass through the transparent cover, the electrolyte

solution and onto the solar cell. Further the device included power conduits for connecting the solar cell to the anode and cathode so that electricity generated by the solar cell drove an electrolysis process.

Regarding claims 26 and 27, Dempsey et al suggest making the anode and cathode from a platinized screen containing a catalyst of platinum and iridium. Therefore, in view of Nakata being silent with respect to the composition of lead pins (244, 246), one of ordinary skill in the art would have been led to have utilized the composite platinum and iridium composition disclosed by Dempsey et al for the purpose of providing adequate catalytic activity to perform the water electrolysis reaction.

Regarding claim 29, it would have been within the expected skill of a routineer in the art to have chosen an optimal membrane thickness to balance the ease of conducting protons (conductivity increases with decreasing thickness) with the ability to prevent mixing of the oxygen and hydrogen gases (ability to keep the gases separate increases with increasing thickness).

9. Claims 24 and 25 are rejected under 35 U.S.C. 103(a) as being unpatentable over Nakata (US 6,204,545) in view of Dempsey et al (US 3,870,616) as applied above to claim 23, and further in view of Dederick (US 5,512,787).

Nakata teaches (see figures) using only the solar panel as the means for generating the electric current for running the electrolyzer.

However, it was well known that solar panels only generated electricity during the day when the sky was sufficiently devoid of clouds.

Dederick teaches (see Figure 1A and abstract) the concept of using other renewable energy sources, such as solar panels, wind generators and wave action generators for powering an electrolyzer to reduce the need for fossil fuels to generate the required electricity. Further, Dederick shows (see Figure 1A) switching gear for using any of a plurality of power sources in combination.

Therefore, it would have been obvious to one of ordinary skill in the art to have used an external renewable energy source, such as a solar cell, hydroelectric plant or a wind turbine to provide the electric power necessary to operate the electrolyzer because Dederick teaches that using such renewable resources reduced reliance on fossil fuels.

Response to Arguments

10. Applicant's arguments with respect to the claims have been considered but are moot in view of the new ground(s) of rejection.

Conclusion

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).


A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any

extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Harry D. Wilkins, III whose telephone number is 571-272-1251. The examiner can normally be reached on M-F 8:30am-5:00pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Roy V. King can be reached on 571-272-1244. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.


Harry D Wilkins, III
Primary Examiner
Art Unit 1742

hdw